AF

PATENT APPLICATION
PO7976
MD03-30

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

APPLICATION OF WILLIAM E. SLACK	GROUP NO.: 1796
SERIAL NUMBER: 10/706,713	EXAMINER: Rabon A. Sergent
FILED: November 12, 2003	
TITLE: STABLE-LIQUID, ALLOPHANATE-MODIFIED DIPHENYLMETHANE DIISOCYANATE TRIMERS, PREPOLYMERS THEREOF, AND PROCESSES FOR THEIR PREPARATION	

LETTER

Mail Stop - Appeal Brief - Patents
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 2231-1450

Sir:

Enclosed is an Appeal Brief in the matter of the subject Appeal. Please charge the fee for filing the Brief, $510.00, to our Deposit Account Number 13-3848. Triplicate copies of this paper are enclosed.

Respectfully submitted,

By _____
N. Denise Brown
Agent for Appellant
Reg. No. 36,097

Bayer MaterialScience LLC
100 Bayer Road
Pittsburgh, PA 15205-9741
Phone: (412) 777-3843
FACSIMILE PHONE NUMBER:
(412) 777-3902
s:\shared\jmf\DB7976.applet

I hereby certify that this correspondence is being deposited with the United States Postal Service as first class mail in an enveloped addressed to: Commissioner for Patents, Alexandria, VA 22313-1450 12/12/07
Date
N. Denise Brown, Reg. No. 36,097
Name of applicant, assignee or Registered Representative
_____
Signature
December 12, 2007
Date

PATENT APPLICATION
PO-7976
MD-03-030

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

APPLICATION OF

WILLIAM E. SLACK

SERIAL NUMBER: 10/706,713

FILED: NOVEMBER 12, 2003

TITLE: STABLE-LIQUID, ALLOPHANATE-MODIFIED DIPHENYLMETHANE DIISOCYANATE TRIMERS, PREPOLYMERS THEREOF, AND PROCESSES FOR THEIR PREPARATION

GROUP NO.: 1796

EXAMINER: RABON SERGENT

APPEAL BRIEF

Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Sir:

This Brief is an appeal from the Final Office Action of the Examiner dated July 16, 2007, in which the rejection of Claims 1-18 was maintained. A Notice of Appeal was filed on October 16, 2007.

I. REAL PARTY IN INTEREST

This application is assigned to Bayer MaterialScience LLC. Thus, Bayer MaterialScience LLC is the real party in interest.

I hereby certify that this correspondence is being deposited with the United States Postal Service as first class mail in an envelope addressed to: Commissioner for Patents, Alexandria, VA 22313-1450 12/12/07
Date

N. Denise Brown, Reg. No. 36,097
Name of applicant, assignee or Registered Representative

Signature

December 12, 2007
Date

II. RELATED APPEALS AND INTERFERENCES

There are no pending appeals or interferences which Appellant is aware of that may be related to, would directly affect, would be affected by or have a bearing on the Board's decision in this appeal.

III. STATUS OF CLAIMS

The above-referenced application was filed with Claims 1-44. No new claims were added during prosecution. In response to a restriction requirement dated September 28, 2005, Claims 19-44 were withdrawn from consideration. In an amendment dated April 8, 2006, Appellant clarified that the NCO group content in Claims 1, 2, 10 and 11 was a % by weight. Claims 1 and 10 were also amended at that time in response to a rejection under 35 U.S.C. § 112, second paragraph. This portion of the amendment served to clarify that when an allophanate catalyst is used, it is used in combination with either a trimer catalyst and/or an allophanate-trimer catalyst system. In the final Office Action dated July 31, 2006, the Examiner asserted that the amended claim language was also indefinite under 35 U.S.C. § 112, second paragraph. Thus, Appellant filed another amendment on September 27, 2006 to further clarify the amended language in Claims 10 and 11. The Examiner refused to enter the amendment stating that it raised new issues that would require further consideration and/or search. Thus, Appellant filed a Request for Continued Examination (RCE) of the application on October 31, 2006 and requested that the September 27, 2006 be entered. Appellant has since filed several responses, but no further amendments have been made to the claims.

IV. STATUS OF AMENDMENTS

Appellant filed an amendment after the final rejection dated July 31, 2006 in which they sought to further clarify the language describing that when an allophanate catalyst is present, that a trimer catalyst and/or a trimer-allophanate catalyst system was also present. This amendment was in response to a rejection under 35 U.S.C. §112, second paragraph and the Examiner refused entry stating that this would require further consideration and/or search. Thus, a Request for

Continued Examination was filed by Appellant on October 31, 2006 to have the amendment entered. A final Office Action in the RCE application was mailed by the Examiner on July 16, 2007. No amendments were presented by Appellant after the final Office Action dated July 16, 2007.

V. SUMMARY OF CLAIMED SUBJECT MATTER

Of the Claims on Appeal, Claims 1 and 10 are independent Claims. Claims 2-9 are directly dependent on Claim 1; and Claims 11-18 are directly dependent on Claim 10. Claims 1-2, 4-11 and 13-18 are argued together, and Claims 3 and 12 are argued together. Thus, a summary of Claims 3 and 12 is also set forth below.

Claim 1 is directed to a stable-liquid, allophanate-modified, partially trimerized diphenylmethane diisocyanate having an NCO group content of from 15 to 30% by weight. (See Page 1, Lines 1-2 and Page 7, Lines 15-17.) (In order to assist the Honorable Board in its evaluation of the invention, reference will be made to the specification in which "P" will designate a page number and "L" will designate the line number(s). These stable-liquid, allophanate-modified, partially trimerized diphenylmethane diisocyanates comprise the reaction product of a)(1) a diphenylmethane diisocyanate (MDI) that comprises (i) from 10 to 40% by weight of the 2,4'-isomer of MDI, (ii) from 0 to 6% by weight of the 2,2'-isomer of MDI, and (iii) from 54 to 90% by weight of the 4,4'-isomer of MDI, with the %'s by weight of (i), (ii) and (iii) totaling 100% by weight of the diphenylmethane diisocyanate; and b) an organic compound containing at least one hydroxyl group; in the presence of c) at least one catalyst selected from the group consisting of (1) one or more trimer catalysts, (2) one or more allophanate catalysts, (3) an allophanate-trimer catalyst system and (4) mixtures thereof, with the proviso that when an allophanate catalyst is present, then a trimer catalyst and/or an allophanate-trimer catalyst system is also present (See P7, L18-30; P8, L1-7; and P17, L23 through P18, L5.) In addition, the organic compound which contains at least one hydroxyl group, i.e. component b), is present in a quantity such that there are from about 0.01 to about 0.25 equivalent hydroxyl groups per equivalent of isocyanate of the MDI present, at least about 50% of the urethane groups are converted to allophanate groups by the catalyst system,

and a catalyst stopper is added once the desired NCO group content is attained. (See P8, L8-11 and L16-17.)

Claim 3 is directly dependent on Claim 1. Claim 3 further defines the isomer distribution of component a)(1) the diphenylmethane diisocyanate. More specifically, the diphenylmethane diisocyanate in Claim 3 comprises (i) from 20 to 35% by weight of the 2,4'-isomer, (ii) from 0 to 2% by weight of the 2,2'-isomer and (iii) from 63 to 80% by weight of the 4,4'-isomer, with the %'s by weight totaling 100% by weight of the diphenylmethane diisocyanate. See P7, L18-28.

Claim 10 is the second independent claim on appeal. Claim 10 is directed to a process for preparing the stable liquid, allophanate-modified, partially trimerized diphenylmethane diisocyanates having an NCO group content of 15 to 30 % by weight (See P1, L2; and P8, L18-20). The product is prepared by (I) heating a)(1) a diphenylmethane diisocyanate (MDI) that comprises (i) from 10 to 40% by weight of the 2,4'-isomer of MDI, (ii) from 0 to 6% by weight of the 2,2'-isomer of MDI, and (iii) from 54 to 90% by weight of the 4,4'-isomer of MDI, with the %'s by weight of (i), (ii) and (iii) totaling 100% by weight of the diphenylmethane diisocyanate; and b) an organic compound containing at least one hydroxyl group; in the presence of c) at least one catalyst selected from the group consisting of (1) one or more trimer catalysts, (2) one or more allophanate catalysts, (3) an allophanate-trimer catalyst system and (4) mixtures thereof, with the proviso that when an allophanate catalyst is present, then a trimer catalyst and/or an allophanate-trimer catalyst system is also present. (See P8, L20 through P9, L13; and P17, L23 through P18, L5.) In addition, the organic compound which contains at least one hydroxyl group, i.e. component b), is present in a quantity such that there are from about 0.01 to about 0.25 equivalent hydroxyl groups per equivalent of isocyanate of the MDI present, at least about 50% of the urethane groups are converted to allophanate groups by the catalyst system. (See P9, L14-17.) The heating is followed by adding a catalyst stopper once the desired NCO group content is attained to neutralize the catalyst in the reaction mixture. (See P9, L21-23.)

Claim 12 is directly dependent on Claim 10. Claim 12 further defines the isomer distribution of component a)(1) the diphenylmethane diisocyanate. More

specifically, the diphenylmethane diisocyanate in Claim 12 comprises (i) from 20 to 35% by weight of the 2,4'-isomer, (ii) from 0 to 2% by weight of the 2,2'-isomer and (iii) from 63 to 80% by weight of the 4,4'-isomer, with the %'s by weight totaling 100% by weight of the diphenylmethane diisocyanate. See 8, L22- through P9, L1.

VI. GROUNDS OF REJECTION TO BE REVIEWED ON APPEAL

Claims 1-2, 4-11 and 13-18 were rejected under 35 U.S.C. § 103(a) as being unpatentable over the Slack et al references (U.S. Patent 5,955,609 or U.S. Patent 6,127,308) in view of the Scholl et al reference (U.S. Patent 5,124,370) and further in view of the Slack et al references (U.S. Patent 5,663,272 or U.S. Patent 6,887,399 or U.S. Patent 6,991,746) or the Rosthauser et al reference (U.S. Patent 5,783,652) or the Markusch et al reference (U.S. Patent 6,482,913).

Claims 3 and 12 were also rejected under 35 U.S.C. § 103(a) as being unpatentable over the Slack et al references (U.S. Patent 5,955,609 or U.S. Patent 6,127,308) in view of the Scholl et al reference (U.S. Patent 5,124,370) and further in view of the Slack et al references (U.S. Patent 5,663,272 or U.S. Patent 6,887,399 or U.S. Patent 6,991,746) or the Rosthauser et al reference (U.S. Patent 5,783,652) or the Markusch et al reference (U.S. Patent 6,482,913).

VII. ARGUMENTS

CLAIMS 1-2, 4-11 AND 13-18 WERE REJECTED UNDER 35 U.S.C. § 103(A) AS BEING UNPATENTABLE OVER THE SLACK ET AL REFERENCES (U.S. PATENT 5,955,609 OR U.S. PATENT 6,127,308) IN VIEW OF THE SCHOLL ET AL REFERENCE (U.S. PATENT 5,124,370) AND FURTHER IN VIEW OF THE SLACK ET AL REFERENCES (U.S. PATENT 5,663,272 OR U.S. PATENT 6,887,399 OR U.S. PATENT 6,991,746) OR THE ROSTHAUSER ET AL REFERENCE (U.S. PATENT 5,783,652) OR THE MARKUSCH ET AL REFERENCE (U.S. PATENT 6,482,913).

Appellant respectfully submitted that this combination of references does not render the presently claimed invention obvious to one of ordinary skill in the art.

It is noted by Appellant that U.S. Patent 6,127,308 issued from a divisional application of the original application which eventually matured into U.S. Patent

5,955,609. Thus, U.S. Patent 5,955,609 and U.S. Patent 6,127,308 have the same disclosure but different claims. Appellant will direct his specific comments to the '609 reference unless otherwise stated.

Appellant also notes that U.S. Patent 6,991,746 issued from a divisional application of the original application which eventually matured into U.S. Patent 6,887,399. Thus, these two patents also have identical disclosures but different claims. Appellant will direct his comments to the '399 patent unless otherwise stated.

A suitable trimer catalyst system for aliphatic and aromatic isocyanates is disclosed by the Slack et al references (U.S. Patents 5,955,609 and 6,127,308). More specifically this system comprises (A) a compound selected from one of three specific groups of lithium compounds or lithium salts, (B) an allophanate catalyst, and (C) an organic compound which contains at least one hydroxyl group. Suitable diisocyanates disclosed of these references ('609 and '308) include diphenyl-methane diisocyanate (see column 7, lines 13, 24 and 33 of the '609 patent).

In the working examples of the Slack et al references (i.e. Examples 10, 14 and 15), the diphenylmethane diisocyanate consisted of 98% by wt. of the 4,4'-isomer and 2% by wt. of the 2,4'-isomer (column 7, lines 50-52). This particular MDI composition is clearly outside the scope of that required by the presently claimed invention. Appellant's claimed MDI composition contains a minimum of 10% of the 2,4'-isomer and a maximum or 90% of the 4,4'-isomer. Thus, it is evident there is no overlap between the presently required MDI component and that of the Slack et al references (U.S. Patents 5,955,609 and 6,127,308).

Combining the Scholl et al reference with the Slack et al references does not fairly suggest the presently claimed invention to one of ordinary skill in the art. The Scholl et al reference broadly discloses that liquid products containing isocyanurate groups can be prepared from a polyisocyanate mixture which contains 80 to 100% by wt. of monomeric MDI and from 0 to 20% by wt. of polymeric MDI. This reference is silent with respect to the formation of allophanate groups.

The diphenylmethane diisocyanate of the Scholl et al reference is broadly described as consisting of 40 to 80% by weight of the 4,4'-isomer, 20 to 60% by

weight of the 2,4'-isomer and 0 to 8% by weight of the 2,2'-isomer, with the sum of these totaling 100% by weight of the monomer (column 2, lines 18-27). However, the polyisocyanate of the Scholl et al reference may also contain up to 20% of polymeric MDI (column 2, lines 17-20). Obviously, if no polymeric MDI is present, then the above isomeric distribution for monomeric MDI is possible. When 20% by weight of polymeric MDI is present, it is apparent that there can only be 80% by weight of monomeric MDI present. Therefore, when 20% by weight of polymeric MDI is present, the monomeric distribution is: from 32 to 64% of the 4,4'-isomer, from 16 to 48% of the 2,4'-isomer and from 0 to 6.4% of the 2,2'-isomer. Accordingly, the actual upper and lower ranges for each of the components in the isocyanate mixtures of the Scholl et al reference are: from 0 to 20% by wt. of polymeric MDI, from 32 to 80% by wt. of 4,4'-MDI, from 16 to 60% by wt. of the 2,4'-MDI and from 0 to 8% by wt. of the 2,2'-MDI, with the sum totaling 100% by weight.

Appellant respectfully submits that combining the Scholl et al reference with the Slack et al reference (the '609 and '308 references) does not provide one of ordinary skill in the art any insight into the presently claimed invention. There is simply no information disclosed in any of these three references which suggests that a stable liquid, allophanate-modified, partially trimerized diphenylmethane diisocyanate can be prepared from the presently required MDI isomer distribution. Sufficient guidance is not provided by the Slack et al references ('609 and '308) and/or the Scholl et al reference to lead the skilled artisan to the presently claimed invention.

Furthermore, the Scholl et al reference only contains three examples of different PMDI mixtures (see column 4, line 65 through column 5, line 12). Isocyanate mixture 2 is the only one that is directly comparable with the present invention as it does not contains polymeric MDI. Isocyanate mixture 2 contains 46-47% of 4,4'-MDI, 52-53% of 2,4'-MDI, and less than 1% of 2,2'-MDI. In Isocyanate mixture 2, it is evident that the 4,4'-MDI content is too low and the 2,4'-MDI content is too high, compared to the presently required MDI component. Thus, substituting this for the MDI component of the Slack et al references does not result in the presently claimed invention.

Isocyanate mixture 1 of the Scholl et al reference contains 10% of polymeric MDI and Isocyanate mixture 3 contains 15% of polymeric MDI. In addition to the 10% polymeric MDI, Isocyanate mixture 1 comprises 56% of the 4,4'-isomer, 29% of the 2,4'-isomer and 5% of the 2,2'-isomer. Isocyanate mixture 3 comprises, in addition to the 15% polymeric MDI, 59% of the 4,4'-isomer, 23% of the 2,4'-isomer and 3% of the 2,2'-isomer.

It is respectfully submit that none of these specific examples of PMDI mixtures in the Scholl et al reference fall within the scope of the presently required MDI composition a)(1). It is readily apparent that neither the first or the third isocyanate compositions therein satisfy the present MDI component as these also contain polymeric MDI. Polymeric MDI is clearly not present in the MDI component of the present invention. This is evident from the claim language which states that the sum of the 2,2'-isomer, the 2,4'-isomer and the 4,4'-isomer totals 100% by wt. of a)(1), i.e. the MDI component. In other words, the MDI compositions required by the presently claimed invention are 100% monomeric MDI.

Only Isocyanate mixture 2 of the Scholl et al reference is 100% monomeric MDI. See column 5, lines 1-6. As previously stated, this composition contains 46-47% of the 2,4'-isomer, 52 to 53% of the 4,4'-isomer and less than 1% by wt. of the 2,2'-isomer. By comparison, the presently claimed MDI compositions contain a maximum of 40% by wt. of the 2,4'-isomer and a minimum of 54% by wt. of the 4,4'-isomer. Therefore, this MDI composition of the Scholl et al reference also does not overlap with the presently required monomeric MDI composition. Appellant therefore submits that substituting the monomeric MDI composition from the Scholl et al reference for that in the Slack et al references does not result in the presently claimed invention.

It is respectfully submitted by Appellant that one skilled in the art has no insight into the necessary modifications to "arrive at" the present invention. Only after reading the present specification does this become "obvious".

One of ordinary skill in the art has no insight into the preparation of partially trimerized isocyanates which additionally contain allophanate groups from the Scholl et al reference. This reference discloses partially trimerized isocyanates (see

Examples 5 and 7 in Table 1) and partially trimerized isocyanates that also contain some urethane groups (see Examples 3, 4, 6, and 8-10 in Table 1). Of these examples, only Examples 7 and 8 are directly comparable with the present inveniotn as these both use Isocyanate mixture 2 which is 100% monomeric MDI.

The product of Example 7 clearly does not contain allophanate groups as a hydroxyl group containing material is not present. In Example 8, although a polyol component is present, the product contains also urethane groups, not allophanate groups. See Table 1 at columns 5-6 of the Scholl et al reference. Thus, Appellant respectfully submits that the Scholl et al reference provides no insight into allophanate-modified isocyanates.

By substituting the MDI composition, and particularly Isocyanate mixture 2, of the Scholl et al reference for that of the Slack et al references and using Slack's catalyst system, this "substitution" yields a process for preparing a partially trimerized isocyanate in which the isocyanate component is Isocyanate mixture 2 from the Scholl et al reference. Appellant respectfully submits that this is clearly not the presently claimed invention. As set forth above, Isocyanate mixture 2 of the Scholl et al reference is outside the scope of the MDI mixture required by the present claims. The isomer distribution of Isocyanate mixture 2 in the Scholl et al reference contains from 46-47% of the 4,4'-isomer, from 52-53% of the 2,4'-isomer and less than 1% of the 2,2'-isomer. By comparison, the present invention requires a diphenylmethane diisocyanate component comprising from 10 to 40% by wt. of the 2,4'-isomer, from 0 to 6% by wt. of the 2,2'-isomer and from 54 to 90% by wt. of the 4,4'-isomer. Accordingly, this substitution does not render the presently claimed invention obvious to one of ordinary skill in the art.

In addition, the Board's attention is directed to Examples 18 and 19 of the present application. These are <u>not</u> allophanate-modified, partially trimerized isocyanates. Instead, these products are just partially trimerized products. It is evident that these examples do not contain allophanate groups as an alcohol or other hydroxyl group containing compound is not present. Thus, allophanate groups are not formed in Examples 18 and 19. The purpose of these examples is to illustrate that a partially trimerized product that is a stable liquid can not be obtained

from a starting MDI composition that is 100% monomer and has a 2,4'-isomer content of less than 38%. Example 18 contained about 28% 2,4'-MDI and Example 19 contained about 38% 2,4'-MDI. The products in both Examples 18 and 19 were turbid with solids.

These two examples clearly illustrate that stable liquid, partially trimerized products can not be prepared from 100% monomeric MDI compositions as described by the Scholl et al reference. These two particular MDI compositions of Examples 18 and 19 overlap with the scope of the presently required MDI component. Appellant respectfully submits that, in light of the fact that one can not form stable liquid, partially trimerized products from the two MDI of Examples 18 and 19, the skilled artisan could not reasonably expect to be able to form stable liquid, allophanate-modified, partially trimerized products from these same MDI compositions.

However, the other working examples of the present application illustrate that allophanate-modified, partially trimerized MDI products which are stable liquids are readily formed from the presently required MDI compositions which the specified isomer distribution. For example, Example 3 contains about 12% by weight of the 2,4'-isomer and about 88% by weight of the 4,4'-isomer. Thus, the isomer distribution of Example 3 is very close to the upper limit of the 4,4'-isomer and the lower limit of the 2,4'-isomer. Examples 5 and 10-17 contain about 37.5% of the 2,4'-isomer, about 1% of the 2,2'-isomer and about 61.5% of the 4,4'-isomer. Thus, these are very close to the upper limit for the 2,4'-MDI and to the lower limit for the 4,4'-MDI. The isomer distribution of the blended product formed in Example 20 is similar to that of Examples 5 and 10-17. The isomer distributions of the remaining examples (i.e. Examples 1, 2, 4 and 6-9) is somewhere in-between these upper and lower limits. It is evident that all of these products are allophanate-modified and partially trimerized since a hydroxyl group containing compound is present in each of these examples. Furthermore, the products of Examples 1-17 and 20 are all clear liquid products (see P30, L22-26, Table 1 on P31-32, and P33, L22 through P34, L10 of the present application).

Only after reading the present specification does it become "obvious" to prepare stable liquid products which are both allophanate-modified and partially trimerized from the presently required MDI compositions. Such a perspective does not, however, provide a proper basis for a rejection under 35 U.S.C. § 103(a).

With regard to the other two MDI compositions specifically disclosed by the Scholl et al reference, it is respectfully submitted that these can not be directly compared to the MDI composition of the present invention as these contain 10% or 15% by weight of polymeric MDI. One can not simply ignore the presence of the polymeric MDI present in these two compositions. It is improper to state that Appellant's required monomeric MDI distribution is "obvious" in view of these two polymeric MDI compositions. In spite of the "appearance" of overlap between the present MDI isomer distribution and these two polymeric MDI compositions, this is not a simple and direct substitution as suggested by the Examiner.

Appellant submits that one of ordinary skill in the art reading the Scholl et al reference would not consider the described monomer portion of the polymeric MDI (PMDI) as being "separate" from the polymeric portion of the PMDI. Each of Isocyanate mixture 1 and Isocyanate mixture 3 in the Scholl et al reference describes one complete composition. Each complete composition has polymeric MDI, 4,4'-MDI, 2,4'-MDI and 2,2'-MDI. By comparison, the present MDI composition is 100% monomeric MDI. This is evident in view of the present claim language which states that the sum of the %'s by weight of the 2,2'-MDI, the 2,4'-MDI and the 4,4'-MDI total 100% of MDI. It is improper for the Examiner to ignore this requirement.

Appellant additionally submits that combining any of the other Slack et al references (i.e. U.S. Patent 5,663,272, U.S. Patent 6,887,399 and/or U.S. Patent 6,991,746) adds nothing more to the rejection. U.S. 5,663,272 is specific to allophanate-modified diphenylmethane diisocyanates. Although the specification also discloses that these may additionally contain urethane, urea and/or biuret groups, no mention of trimer groups is made by Slack et al. Also, these allophanate-modified isocyanates are prepared by first reacting an organic hydroxyl group containing material with a monoisocyanate, then reacting this product with a mixture

of isomers of MDI. This product can be additionally reacted with an organic compound to form a prepolymer of the allophanate-modiifed isocyanate. Appellant respectfully submits that it is evident that this process and product are different than that of the present invention. This reference is silent with respect to partial trimer formation.

Combining the Slack et al reference (U.S. 5,663,272) with the primary Slack et al references and the Scholl et al reference does not fairly suggest the presently claimed invention. This combination of references does not support the conclusion by the skilled artisan that one can make stable liquid, allophanate-modified, partially trimerized MDI compositions from the presently required MDI component with the specified isomer distribution. This is simply not suggested.

The last two Slack et al references (U.S. 6,887,399 and 6,991,746) are even less relevant. These references relate to making polymeric allophanates of diphenylmethane diisocyanates. The present invention has nothing to do with polymeric allophanates, so it is unclear why one of ordinary skill in the art would consider these "pertinent" to patentability of the present claims. Furthermore, these two Slack et al reference are silent with respect to preparing stable-liquid, allophanate-modified, partially trimerized products based on MDI.

The monomeric MDI of these last three Slack et al references consists of 0 to 60% of 2,4'-isomer, up to 6% 2,2'-isomer and the balance is 4,4'-isomer. It is apparent that these %'s and those of the Scholl et al reference overlap. As discussed above, the fact that one can not make a stable liquid partially trimerized product from MDI compositions having less than about 38% by weight 2,4'-MDI (see previous discussion of Examples 18 and 19) makes it impossible for the skilled artisan to reasonably conclude or expect that the presently claimed isomer distribution of MDI is suitable for preparing stable-liquid, allophanate-modified, partially trimerized products. Rather, one of ordinary skill in the art would expect that a higher content of 2,4'-MDI (i.e. at least greater than 38% by weight) is necessary for the allophanate-modified, partially trimerized products to be stable-liquids. Therefore, the skilled artisan has no insight into the presently claimed invention from this combination of references.

The relevance of the Rosthauser et al reference to this rejection is also unclear to Appellant. This reference describes mixtures of urethane prepolymers of allophanate-modified diphenylmethane diisocyanates in which an epoxide is added to stabilize the reactivity. There is no information about partial trimerization of these isocyanates, and the only specific MDI composition described is 98% of 4,4'-MDI and 2% of 2,4'-MDI. Thus, the Rosthauser et al reference adds nothing more to the rejection. As discussed above, the other cited references fail to suggest that allophanate-modified, partially trimerized products which are stable liquids can be prepared from the presently required MDI isomer distribution. The skilled artisan has no insight into the presently claimed invention upon combining the Rosthauser et al reference with the primary and secondary references, and/or the Slack et al references.

The Markusch et al reference describes liquid MDI adducts with improved freeze stability. This reference, like the Rosthauser et al reference, makes allophanate-modified and adds an epoxide to improve stability. It is also silent about partial trimerization of the isocyanate groups. The MDI used in the examples of this reference have either (1) 98% 4,4'-MDI and 2% 2,4'-MDI; or (2) 44% 4,4'-MDI, 54% 2,4'-MDI and about 2% of 2,2'-MDI. It is obvious that these also do not fairly suggest the presently required isomer distribution of MDI to one of ordinary skill in the art, either alone or in combination with any of the other cited references.

Therefore, Appellant respectfully submits that the presently claimed invention is not properly rejected as being obvious in view of this combination of references.

It is readily apparent that a simple substitution of any of the various MDI compositions into the primary reference(s) does not result in the presently claimed invention. In addition, the various references do not suggest the necessary modifications to the isomer distribution of the disclosed MDI compositions to "arrive at" the present isomer distribution.

Appellant respectfully submits that the present invention is not rendered obvious by the Slack et al references (U.S. Patent 5,955,609 or U.S. Patent 6,127,308) in view of the Scholl et al reference (U.S. Patent 5,124,370) and further in view of the Slack et al references (U.S. Patent 5,663,272 or U.S. Patent

6,887,399 or U.S. Patent 6,991,746) or the Rosthauser et al reference (U.S. Patent 5,783,652) or the Markusch et al reference (U.S. Patent 6,482,913).

CLAIMS 3 AND 12 WERE ALSO REJECTED UNDER 35 U.S.C. § 103(A) AS BEING UNPATENTABLE OVER THE SLACK ET AL REFERENCES (U.S. PATENT 5,955,609 OR U.S. PATENT 6,127,308) IN VIEW OF THE SCHOLL ET AL REFERENCE (U.S. PATENT 5,124,370) AND FURTHER IN VIEW OF THE SLACK ET AL REFERENCES (U.S. PATENT 5,663,272 OR U.S. PATENT 6,887,399 OR U.S. PATENT 6,991,746) OR THE ROSTHAUSER ET AL REFERENCE (U.S. PATENT 5,783,652) OR THE MARKUSCH ET AL REFERENCE (U.S. PATENT 6,482,913).

The invention of Claims 3 and 12 requires that the MDI composition have an isomer distribution of (i) 20 to 35% by weight of the 2,4'-isomer, (ii) from 0 to 2% by weight of the 2,2'-isomer, and (iii) from 63 to 80% by weight of the 4,4'-isomer, with the %'s by weight of (i), (ii) and (iii) totaling 100% by weight of the diphenylmethane diisocyanate.

Appellant respectfully submits that the isomer distribution of this MDI composition is not obvious to one of ordinary skill in the art upon reading this combination of references. As discussed above, the primary Slack et al references (the '609 and the '308 patents) only disclose one MDI composition and it has 98% of 4,4'-MDI and 2% of 2,4'-MDI.

The Scholl et al reference only discloses three specific MDI mixtures. As Appellant has pointed out, only one of these is 100% monomeric MDI and thus, directly comparable with the required MDI composition. Isocyanate mixture 2 (see column 5, lines 1-7 of the '370 patent) contains 46-47% of 4,4'-MDI, 52-53% of 2,4'-MDI and less than 1% of 2,2'-MDI. By comparison, Claims 3 and 12 have a 4,4'-MDI content of 63 to 80%, a 2,4'-MDI content of 20-35% and a 2,2'-MDI content of 0-2%. It is evident there is no overlap between the claimed MDI composition and the only 100% monomeric composition of the Scholl et al reference.

The other two specific MDI mixtures of the Scholl et al reference contain 10% polymeric MDI and 15% polymeric MDI respectively. Isocyanate mixture 1 contains 56% of 4,4'-MDI, 29% of 2,4'-MDI, 5% of 2,2'-MDI and 10% of polymeric MDI. See

column 4, lines 64-68. Comparing this to the MDI composition of the invention, in addition to the presence of polymeric MDI in the composition of the reference, it also contains a lower content of 4,4'-MDI and a higher content of 2,2'-MDI than allowed by Appellant's claim language. Even if one completely ignores the polymeric MDI and assumes that the three isomers account for 100% of the MDI, the content of the 2,2'-MDI is too high and the content of the 4,4'-MDI is too low to fall within the scope of the presently claimed MDI composition.

Isocyanate mixture 3 of the Scholl et al reference (see column 5, lines 8-11) contains 59% of 4,4'-MDI, 23% of 2,4'-MDI, 3% of 2,2'-MDI and 15% of polymeric MDI. By comparison, the present invention requires an MDI composition that contains from 63 to 80% of 4,4'-MDI, from 20 to 35% of 2,4'-MDI and 0 to 2% of 2,2'-MDI. It is readily apparent that Isocyanate mixture 3 also contains a 4,4'-MDI content that is too low and a 2,2'-MDI content that is too high, in addition to the 15% of polymeric MDI. Thus, this isocyanate mixture is also outside the scope required by the present claims. Even if one ignores the polymeric MDI content as the Examiner has, the 2,2'-MDI content of Isocyanate mixture 3 is still outside the presently required range of 0-2% by weight.

Appellant respectfully submits that one of ordinary skill in the art can not simply substitute one of the isocyanate mixtures from the Scholl et al reference into the primary Slack et al references and "arrive at" the presently claimed invention. In addition, as discussed above, Appellant's Examples 18 and 19 demonstrate that one can not make partially trimerized products that are stable liquids from MDI isomeric compositions in which the 2,4'-MDI content is less than about 38%. However, Appellant claims a 2,4'-MDI content of 20 to 35% is suitable for making stable liquid, allophanate-modified, partially trimerized MDI compositions. If one can not make a stable partially trimerized product from less than 38% of 2,4'-MDI, why would one expect to be able to make a stable allophanate-modified, partially trimerized product from a lower 2,4'-MDI content?

In addition, the remaining references for the reasons as set forth above, add nothing further to the rejection of Claims 3 and 12. None of these references disclose or suggest a MDI composition having 20-35% of 2,4'-MDI, 0-2% of 2,2'-MDI

and 63-80% of 4,4'-MDI. Each of these references is also silent with respect to making trimers or partial trimers. Appellant respectfully submits that combining any one of the Slack et al references (U.S. Patent 5,663,272 or U.S. Patent 6,887,399 or U.S. Patent 6,991,746), the Rosthauser et al reference (U.S. Patent 5,783,652) and/or the Markusch et al reference (U.S. Patent 6,482,913) with the primary and/or secondary references does not fairly suggest the presently claimed invention to one of ordinary skill in the art.

It is respectfully submitted that the invention of Claims 3 and 12 is not properly rejected as being obvious in view of the Slack et al references (U.S. Patent 5,955,609 or U.S. Patent 6,127,308) in view of the Scholl et al reference (U.S. Patent 5,124,370) and further in view of the Slack et al references (U.S. Patent 5,663,272 or U.S. Patent 6,887,399 or U.S. Patent 6,991,746), the Rosthauser et al reference (U.S. Patent 5,783,652) and/or the Markusch et al reference (U.S. Patent 6,482,913).

In view of the preceding arguments, Appellant respectfully submits that each of the Examiner's rejection is in error and respectfully request that these rejections be reversed. The allowance of Claims 1-18 is respectfully requested.

Respectfully submitted,

By _____

N. Denise Brown
Agent for Appellant
Reg. No. 36,097

Bayer MaterialScience LLC
100 Bayer Road
Pittsburgh, Pennsylvania 15205-9741
(412) 777-3804
FACSIMILE PHONE NUMBER:
(412) 777-3902

LF/BROWN/db108

VIII. CLAIMS APPENDIX:

The following is a listing of the claims on Appeal.

Claim 1. A stable liquid, allophanate-modified, partially trimerized diphenylmethane diisocyanate having an NCO group content of from 15 to 30% by weight and comprising the reaction product of:

a)(1) a diphenylmethane diisocyanate comprising:

(i) from 10 to 40% by weight of 2,4'-diphenylmethane diisocyanate,

(ii) from 0 to 6% by weight of 2,2'-diphenylmethane diisocyanate, and

(iii) from 54 to 90% by weight of 4,4'-diphenylmethane diisocyanate, wherein the %'s by weight of a)(1)(i), a)(1)(ii) and a)(1)(iii) total 100% by weight of a)(1);

and

b) an organic compound containing at least one hydroxyl group, in the presence of a catalytic amount of

c) at least one catalyst selected from the group consisting of (1) one or more trimer catalysts, (2) one or more allophanate catalysts, (3) an allophanate-trimer catalyst system and (4) mixtures thereof, with the proviso that when said catalyst c)(2) is present, then catalyst c)(1) and/or catalyst system c)(3) is also present;

wherein component b) is present in a quantity such that there are from about 0.01 to about 0.25 equivalent hydroxyl groups per equivalent of isocyanate of the MDI present, at least about 50% of the urethane groups are converted to allophanate groups by c) said catalyst or catalyst system, and a catalyst stopper is added once the desired NCO group content is attained.

Claim 2. The stable liquid, allophanate-modified, partially trimerized diphenylmethane diisocyanate of Claim 1, wherein the NCO group content is from 20 to 28% by weight.

Claim 3. The stable liquid, allophanate-modified, partially trimerized diphenylmethane diisocyanate of Claim 1, wherein a)(1) said diphenyl-methane diisocyanate comprises (i) from 20 to 35% by weight of the 2,4'-isomer, (ii) from 0 to 2% by weight of the 2,2'-isomer, and (iii) from 63 to 80% by weight of the 4,4'-isomer, with the %'s by weight of a)(1)(i), a)(1)(ii) and a)(1)(iii) totaling 100% by weight of a)(1).

Claim 4. The stable liquid, allophanate-modified, partially trimerized diphenylmethane diisocyanate of Claim 1, wherein component b) is present in an amount such that there are from about 0.01 to 0.20 equivalent hydroxyl groups per equivalent of isocyanate of the diphenylmethane diisocyanate present.

Claim 5. The stable liquid, allophanate-modified, partially trimerized diphenylmethane diisocyanate of Claim 1, wherein at least about 70% of the urethane groups are converted to allophanate groups by c) said catalyst.

Claim 6. The stable liquid, allophanate-modified, partially trimerized diphenylmethane diisocyanate of Claim 1, wherein the allophanate groups and the trimer groups were formed simultaneously.

Claim 7. The stable liquid, allophanate-modified, partially trimerized diphenylmethane diisocyanate of Claim 1, wherein the allophanate groups were formed first, and then the trimer groups were formed.

Claim 8. The stable liquid, allophanate-modified, partially trimerized diphenylmethane diisocyanate of Claim 1, wherein b) said organic compound has a

molecular weight of from about 32 to about 6,000 and contains from about 1 to about 4 hydroxyl groups.

Claim 9. The stable liquid, allophanate-modified, partially trimerized diphenylmethane diisocyanate of Claim 1, wherein b) comprises 2-propanol or isobutyl alcohol.

Claim 10. A process for the preparation of a stable liquid, allophanate-modified, partially trimerized diphenylmethane diisocyanate having an NCO group content of from 15 to 30% by weight, comprising:

(1) heating

a)(1) diphenylmethane diisocyanate comprising:

(i) from 10 to 40% by weight of 2,4'-diphenylmethane diisocyanate,

(ii) from 0 to 6% by weight of 2,2'-diphenylmethane diisocyanate,

and

(iii) from 54 to 90% by weight of 4,4'-diphenylmethane diisocyanate,

wherein the %'s by weight of a)(1)(i), a)(1)(ii) and a)(1)(iii) total 100% by weight of a)(1);

and

b) an organic compound containing at least one hydroxyl group,

to a temperature of about 70 to 120°C for a time period of about 1 to about 6 hrs., in the presence of a catalytic amount of:

c) at least one catalyst selected from the group consisting of (1) one or more trimer catalysts, (2) one or more allophanate catalysts, (3) an allophanate-trimer catalysts system and (4) mixtures thereof, with the proviso that when catalyst c)(2) is

present, then catalyst c)(1) and/or catalyst system c)(3) is also present;

wherein the quantity of b) is such that there are from about 0.01 to about 0.25 equivalent hydroxyl groups per equivalent of isocyanate of the MDI present, and at least about 50% of the urethane groups are converted to allophanate groups by c) said catalyst(s),

and

(2) adding a catalyst stopper once the desired NCO group content of the reaction mixture in (1) is attained to neutralize the catalyst in the reaction mixture.

Claim 11. The process of Claim 10, wherein the NCO group content is from 20 to 28% by weight.

Claim 12. The process of Claim 10, wherein a)(1) said diphenylmethane diisocyanate comprises (i) from 20 to 35% by weight of the 2,4'-isomer, (ii) from 0 to 2% by weight of the 2,2'-isomer, and (iii) from 63 to 80% by weight of the 4,4'-isomer, with the %'s by weight of a)(1)(i), a)(1)(ii) and a)(1)(iii) totaling 100% by weight of a)(1).

Claim 13. The process of Claim 10, wherein component b) is present in an amount such that there are from about 0.01 to 0.20 equivalent hydroxyl groups per equivalent of isocyanate of the diphenylmethane diisocyanate present.

Claim 14. The process of Claim 10, wherein at least about 70% of the urethane groups are converted to allophanate groups by c) said catalyst.

Claim 15. The process of Claim 10, wherein c) the catalyst is selected such that the allophanate groups and the trimer groups form simultaneously.

Claim 16. The process of Claim 10, wherein c) the catalyst is selected such that the allophanate groups are formed first, and then another suitable catalyst c) is added such that the trimer groups are formed.

Claim 17. The process of Claim 10, wherein b) said organic compound has a molecular weight of from about 32 to about 6,000 and contains from about 1 to about 4 hydroxyl groups.

Claim 18. The process of Claim 10, wherein b) comprises 2-propanol or isobutyl alcohol.

IX. EVIDENCE APPENDIX:

No evidence has been submitted by Appellant.

X. RELATED PROCEEDINGS APPENDIX:

Appellant has not identified any applications under Section II, titled "RELATED APPEALS AND INTERFERENCES". Accordingly, there is nothing to submit under this section.